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"22, *Trinity College*, Nov. 21, 1863.

"DEAR SIR,—I send you the direction of wind every second hour from the commencement of the gale on 28th October, until it passed away, on the 30th, 1863, and find on reference that the gale was in Dublin October 29.

"Wind, October 28, 1863, commenced to blow from S. E. at 6 A. M.; 8 A. M., S. S. E.; 10 A. M., S. S. W.; 12 noon, S. W.; 2 and 4 P. M., S. W.; 6 P. M., S. S. W.; 8 P. M., S. W.; 10 P. M. and 12 midnight, S. W.

"October 29th, 2 and 4 A. M., S. S. W.; 6, 8, and 10 A. M., 12 noon, 2,* 4, 6, 8, and 10 P. M., 12, midnight, wind S. W.

"October 30th, 2, 4, 6, 8, 10 A. M., and 12 noon, 2 and 4 P. M., wind S. W.; 6 and 8 P. M., W. S. W.; 10 P. M. and 12 midnight, wind S. W.

"Yours faithfully,

"JOHN METTAM.

"To the Rev. Professor Haughton."

J. B. JUKES, Esq., read a paper—

ON CRANNOGES IN LOUGH REA.† By G. HENRY KINAHAN, Geological Survey of Ireland.

THE crannoges to be described in this paper occur in Lough Rea, which is situated in the parishes of Loughrea and Killeenadeema, barony of Loughrea, county of Galway, Sheet 105 of the Townland Ordnance Survey, and at the east margin of Sheet 115 of the one-inch Map of Ireland.

At the south-east of the lake is a group of rocks, called "Stone Islands, South;" at the east, an island, called "Stone Island, North;" at the north-east are five islands, called "Barrack, Long, Middle, Bush, and Switch Islands;" at the north-west, "Blake's Island;" near the west shore, "Reed's and Shore Islands;" at the south-west, "Ash Island;" and about 200 yards from the south shore is "Island M'Coo." The last four have been found to be *crannoges*, or artificial islands.

On looking at the Ordnance Map (Galway, Sheet 105), it will be seen that within a mile of the lake there are twenty-one *raths* or *raheens*, all of which, except two, are in the vicinity of the crannoges, two of the largest being in the immediate neighbourhood of Shore Island,‡

* From 11½ A. M. wind = 16 miles per hour.

† In Hardiman's "History of Galway" we find the ancient name of the town of Loughrea was *Baile Riogh*; from which it would appear that Rea is a corruption for Riogh, and that the name of the lake ought to be Lough Riogh, that is, the *Royal Lake*, or *The Lake of the Kings*. This name may have been so called from one of the crannoges having been the residence of the kings or chiefs of the sept that inhabited the district thereabout; or perhaps it is much more modern, the town having been called Baillie Riogh, after *MacWilliam Eighter* (Sir William or Ulick De Burgo), one of its founders, who declared himself King of Connacht, and the lake Lough Riogh from the same. For neither of these conjectures is there documentary evidence; but the former seems to be the most probable, as in the latter case the lake would naturally have been called Baillierigh Lough, or, to modernize it, Ballyrea Lough.

‡ One lies between Lord Dunlo's new house and Shore Island; the other, called Knocknasop, a little west of Lord Dunlo's house.

the largest and most important crannoge of the lake. There is a tradition in the country about Lough Rea, "that a city lies buried under the lake," which must have been handed down from generation to generation, as it undoubtedly points to the time when the crannoges were submerged, some of which may still be undiscovered, as on a calm day, in the shallow parts of the lake, heaps of regularly placed stones can be observed, all of which may be ancient habitations, and part of the submerged city.

While stationed in Loughrea last winter (1862), I was informed that Shore Island contained numerous bones, and that piles had been observed in places round and across it. I inferred, therefore, that it must be a crannoge; and during last summer I examined all the islands in the lake, and found that Reed's Island, Shore Island, Ash Island, and Island M'Coo, are crannoges, while Blake's Island may be one. The accompanying sketches, taken from the fair-green of Loughrea, will show the relative positions of these. Reed Island lies a little on the right of sketch, Fig. No. 1. It was not included, as it lies so low as to be unobserv-

Fig. 1.

able in any picture. Shore Island lies immediately below Lord Dunlo's house, in Fig. No. 1; Ash Island is toward the left of the same sketch, near the shore; and Island M'Coo is the wooded island, toward the left of sketch, Fig. No. 2.

Fig. 2.

By the kind permission of Lord Clancarty and Mr. Blake (Lord Clancarty's agent), I was enabled to explore Reed's, Shore, and Ash Islands; but to the proprietor of Island M'Coo (Lord Huntington) I did not make application, as by the time the others were examined, the waters of the lake had risen, and stopped all satisfactory work. In fact, but for this reason I would have made additional excavations in Shore Island.

Crannoge No. I., or Reed's Island, is situated at the N. W. corner of the lake, about fifty yards from the present shore. Fig. No. 3 is a plan

Fig. 3.—Scale, 20 feet to 1 inch.

and section of it. It lies very low, being covered with water during the winter months; but, owing to the late remarkably dry summer, the island, at the latter end of June, stood 12 inches above the water.

The following is the section which the crannoge afforded, commencing at the surface:—

	SECTION No. 1.		Feet.	Inches.
7. Loose stones, laid in regular order,	0		6	
6. Marl, with a few stones,	1		3	
5. Peat, with a few stones,	0		9	
4. Large stones, with peat between them,	1		0	
3. A layer of branches and trunks of birch trees (some 6 inches in diameter),	0		6	
2. Squared oak beams, 4 × 7 inches, lying N. and S. (mag.) .	0		4	
1. Squared oak beams, 4 × 7 inches, lying E. and W. (mag.) .	0		4	
	4		8	

Round the island there is a circle, formed of piles, the piles being 2 feet apart, and each being about 4 × 8 inches; but their length was not ascertainable. For about 2 yards on the inside of the piles, and about 3 yards on the outside, on the surface of the island, there were regularly placed flat stones, marked No. 7 in section. Running

nearly N. and S. across the crannoge, are three sets of piles, 4 feet long, and 3×3 inches thick, marked on section and plan B, C, D. One of them is in the accompanying collection, No. 61.

In making the excavations, the moment bed No. 6 was cleared out, the water burst up, and impeded all satisfactory work. In all the workings subsequently opened, bed No. 3 was reached; but only in one instance were we able to get down to the lower beams, No. 1 in section, and then the influx of water prevented us finding what was below. In bed No. 6 a few bones were found that were much broken and gnawed. They seemed to belong to oxen, sheep, and pigs. Also a rough oak plank, No. 69 in collection, about a foot square; and at the surface of the bed a whetstone (No. 3 in collection). In an excavation on bed No. 5 there was found a quantity of wood ashes; and adjacent to them a circular wooden *noggin*, or *meather*, 4 inches in diameter, and 3 inches high, with a small round handle near its upper margin, which was bevelled to an edge. This *meather* was whole when taken out, but subsequently fell to pieces, as it was perforated by rootlets of bog plants. Near it was what seemed to be the handle of another wooden vessel; but, although it was freshly broken, the other pieces of it could not be found. In another excavation were found a piece of sharpening stone (No. 4), a slab of sandstone (Nos. 1 and 2), nearly 9 inches square, which seemed to have been used as a hearthstone; a piece of iron (No. 6), 4 inches long, apparently a portion of some sort of cutting instrument; and some bright red colouring matter, rolled up in a piece of birch bark.

The centre of this island, as marked on the Ordnance Map, is 271 feet above the level of the sea, while the height of the lake is 270.5 feet, which would leave a difference of 6 inches in favour of the crannoge; and by section No. 1, we find that the lowest beams of it are 4 feet 2 inches lower than the level of the lake. From this it would appear that the then surface of the water of the lake must have been at least 5 feet lower than at present; which would only leave the floor of the crannoge 1.5 feet above the water. It seems to have originally consisted of a circular wooden platform, round which was a circular wall, the framework of which were the piles, the interstices being filled with sods. As the lake rose, it was found necessary to raise the floor, first by a mass of birch timber, and branches, and afterwards by a layer of stones. About this time it may have been divided into compartments, by the north and south lines of piles, as they do not seem to go down lower than the oak beams. I should here mention, that whenever we find rows of piles, they appear to have been the framework of either a sod or wicker wall; in this crannoge they seem to have been the former. The last occupiers of which we have any trace coated the surface of the island with flat stones.

No. 5 in the collection was found near the surface of the crannoge. The bones in this and the other crannoges were more abundant near the outside piles than elsewhere. They are all very much broken, and many have also the appearance as if they were gnawed by dogs.

Crannoge No. II., or Shore Island, lies about a quarter of a mile S.W. of No. I. Figs. Nos. 4, 5, and 6 are a plan and section of it. For-

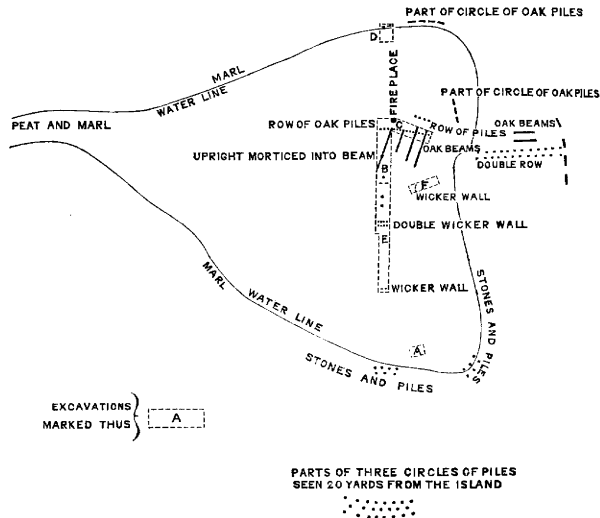


Fig. 4.—Scale, 80 feet to 1 inch.

merly from it to the mainland was a rampart, or moat, formed of marl and peat, about 4 yards wide; but within the last forty years the water of the lake has cut away about 15 yards of this, and made an island of the crannoge. Fifteen years ago numerous excavations were made in this island by the country people, in search of bones, in order to make sale of them for manure. Along with the bones various articles were found, a list of some of which will be hereafter given. The bones were first remarked immediately outside the island, when the waters of the lake were very low. Afterwards the country people found that they occurred in great plenty in the island, especially near the margin and in the northern part, which is now burrowed by these old excavations. In these burrows, and also outside the island, piles can be observed.

On examining the island, the south, south-east, and east shores are found to be a mass of stone between and outside two semicircles of oak piles, while the west and north are banked up with the shell marl, which is now being deposited on the bottom of the lake. About 20 yards south

of the island three circles of piles can be seen below the water on a calm day. They are about a yard apart. 35 feet from the east shore, part of a circle of piles is visible under the water; they may be part of the circle that was found in the most northern excavation, hereafter mentioned, as the heads of a circle of piles were observed among the reeds on the north of the island. From the east shore a double row of piles runs out to the circle, and on the north of the double row are horizontal beams parallel to it. A little N.W. of the double row, in an old working, there is part of a circle of piles; and in another, a row of piles running nearly E. and W. Mr. Hemsworth, of Danesfort, who spent many of his younger days boating on the lake, and knows every part of it, informs me, that on the upper end of some of the upright piles there were the marks of where horizontal beams were morticed on them. These seem now to have disappeared, as I did not remark them.

I caused to be made six excavations in this crannoge. The first ran S. from the trigonometrical point for 48 feet. It is marked E on plan. The north end was not carried down very deep, and gave the following section:—

SECTION No. 2.

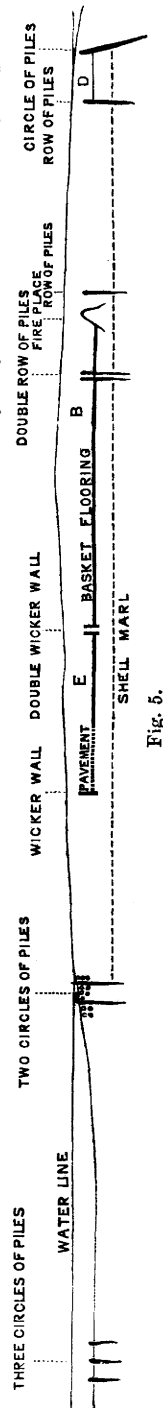
	Feet.	Inches.
5. Stones, peat, and clay, } bones scattered sparingly {	1	4
4. Marl and peat, } through them, {	1	0
3. Marl (8 inches), peat (12 inches),	1	8
2. Scraws or peat sods,	1	0
1. Marl, not sunk into.		
	5	0

At about 35 feet from the north end, there was the following section:—

SECTION No. 3.

	Feet.	Inches.
6. Clay, stones, and peat, with bones,	1	6
5. Yellow sandy marl,	2	6
4. Turf sods, with heather and moss,	1	0
3. Horizontal basket flooring,	0	1
2. Sandy clay,	3	0
1. Turf sods, with heather and moss,	0	6
	8	7

By the Ordnance Map, the centre of this island is 3·5 higher than the water of the lake; and as the place where this section was taken was $1\frac{1}{2}$ foot lower than the centre, we find that the basket flooring (No. 3) is about 3 feet lower than the lake, and the lower turf sods



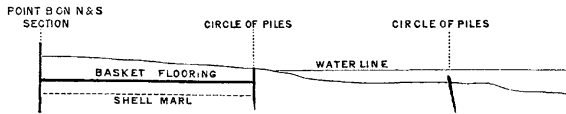


Fig 6.

6 feet. From this it would appear that the lower sods were placed before crannoge No. 1 was built; at least that the water of the lake was at least 7 feet lower than at present.

When bed No. 1 was cut, the water rushed up with a loud noise, like a pistol shot, and drove us out of the workings; that the layer was artificial was proved by the heather and moss on the sods. They were quite fresh, and had all the appearance of being recently cut, so much so, that when the men at work first saw them, they were fully persuaded they were opening an old hole that had only a short time previously been filled up.

In bed No. 2 no bones were remarked. This had the appearance of a bed deposited by water.

In bed No. 4 no bones were remarked; but the heather and mosses were similar to those found in bed No. 1.

Bed No. 5 had all the appearance of an alluvial deposit. A few bones were scattered through it, and the lump of metal dross (Nos. 51 and 52) was found near the bottom of it.

In bed No. 6 were found a few bones, and the following articles:—

No. 48, a quartz pebble. This may be either a sea stone, or a pebble from the old red conglomerate.

No. 49, a hone.

No. 50, a hone.

No. 53, an iron implement; seems to be part of a shears.

At the south end of this excavation was a perpendicular, single, wicker work wall or partition that went down to the level of the basket flooring; but from it, for 11 feet towards the north there was a rough pavement, on which was a thin layer of gravel. The surface of the pavement was on a level with the basket flooring. The accompanying sketch, taken by my colleague, Mr. F. J. Foot, shows the wicker wall, pavement, and basket flooring. About 20 feet north of this single wall, there occurred a double one, that was 20 inches wide, the centre of it being filled up with peat sods. The upright stakes in both

were about 1 foot apart. Nos. 64, 65, 66, and 67 are some of the upright stakes from these wicker walls. To the north of the last-mentioned wall, there were two piles, or rather butts of piles, about 1 foot long, the lower ends of which were quite flat, the flattened surface being apparently cut by some chopping implement. They rested on the surface of the bed No. 1, in Section 2. These and the double wicker wall did not go far up into bed No. 2 (same section), and the tops of them and the wickerwork wall were all charred, as if the structure had been burnt down. The same remark applies to the southern wicker walls, and to a wicker wall hereafter to be mentioned; but in these two latter cases, if they were destroyed by fire, they were not burnt down so low as the double wall or the two piles, as they were over 2·5 feet high. On the north of the double wicker wall, in beds, Nos. 3 and 4, Section 2, were numerous small heaps of ashes, and near some of them were flat stones, that evidently had been used as hearths, as they had all the appearance of being burnt by fire. The basket flooring was made of hazel rods, from 1 inch to $\frac{1}{2}$ inch in diameter. Some were squeezed quite flat by the pressure of the overlying mass, and were so rotten that a specimen of the basket work could not be procured.

The second excavation ran north for 30·5 feet from the north end of the last described. It is marked on plan as B. The following section was measured at its north end:—

SECTION No. 4.		Feet.	Inches.
5. Soil, peat, and stones, with a few bones,	1	6	
4. Marl and peat, with a quantity of bones,	2	7	
3. Heather sods,	0	9	
2. Chips of wood and peat, with basket flooring near the base,	0	4	
1. Heather sods,	1	7	
		6	9

When bed No. 1 was cut through, the water spouted up, and prevented my observing what was underneath. The heather sods had not knitted together, but were quite fresh looking, like those described in Section No. 3. Here we were able to measure their original size, which was about 1 foot square by 5 inches thick.

In bed No. 2 the chips were nearly all deal, and in it, slightly oblique to the length of the hole, ran a horizontal oak beam, that was 10 inches wide by 2·5 deep; on this lay the basket flooring.*

At about 6 feet from the north end of the beam, there was an upright morticed into it; the upright was 2 feet 2 inches high. The south end of the beam ran into the bank of the excavation, and was not followed. Upright stakes ran south from the upright; they seem to have been part of some sort of partition. One of them, No. 63, is in the collection.

* On comparing Sections Nos. 3 and 4, it will be seen that the beds above the basket flooring are very similar, and of nearly equal thickness.

The sods in bed No. 3 were similar to those in No. 1.

Immediately at the bottom of bed No. 4 there was a thin layer of sand, full of bones; and in it, or immediately above it, the following were found:—

- No. 16. A fine hone, with a mark on it as if it had been used to sharpen fish hooks or some pointed implement.
- No. 17. A hone—Silurian grit.
- No. 18. Ditto—Old red sandstone.
- No. 19. Ditto. ditto.
- No. 20. Similar to No. 16.
- No. 21. A small slab of sandstone, used for sharpening.
- No. 22. A hone—Old red sandstone.
- No. 23. Ditto. ditto.
- No. 24. A fine hone. It seems to be one of the Silurian grits got in the hills north of Roxborough.
- No. 25. A small celt—Silurian?
- No. 26. A small sling-stone—Quartzite pebble from the old red conglomerate.
- No. 27. A large sling stone—Made from old red sandstone.
- No. 28. Small sea stone—Trappean porphyry, like some of those north-west of Galway.
- No. 29. Small arrow-head—Chert from the limestone.
- No. 30. A small stone.
- No. 31. A piece of a clay crucible.
- No. 34. A piece of bone, like a rude spoon.
- No. 60. A knife, set in a rude bone handle.

Most of these were close together, near the north end of the excavation; and adjoining them was a large heap of ashes. I may here mention that immediately east of this, as will be hereafter mentioned, a hearth was discovered. The bones found in this bed were all smashed to pieces.

In bed No. 5 there were a few bones; and near the surface was a piece of iron (Nos. 32 and 33), which looks like part of a modern knife.

At the north end of this working were round ash piles that ran nearly east and west (E & S. Mag.); they were 2·5 feet apart, and between them was a peat wall.

For 32·5 feet on the north of excavation B there was a space full of old holes that we did not work; but at the end of it was opened a working, marked D on plan. This was 7·5 feet long (north and south), and about 5 feet wide. It gave the following section:—

SECTION No. 5.

	Feet.	Inches.
3. Marl, full of shells, part of what is now being deposited on the bottom of Lough Rea,	2	0
2. Peat, with bones,	4	0
1. Marl, full of shells, similar to No. 3, over	6	0
	12	0

This excavation was opened at a place which is 3·5 feet lower than the centre of the island. It was carried down for 6 feet; and a six foot pole was forced down into the marl without finding any change. From this it would appear that the sods bed No. 1, in Section 3, was at the bottom of the artificial work.

In bed No. 2 the wicker flooring occurred, but its exact position was not noticed.

At the north end of the excavation a segment of a circle of oak piles occurred, which came up to within 8 inches of the surface of bed No. 3. The tops of these inclined inwards, at about an angle of 75°; they were about 6 inches apart, 15 inches wide, 5 inches thick, and over 8 feet long. At the south end of the excavation were two circular ash piles, that seemed to be part of a partition. They were 7 inches in diameter, 6 feet long, ran 8 inches up into bed No. 3, and 1 foot 4 inches down into bed No. 1. A bone article, like the handle of a large gimlet, was found near the bottom of this bed; it is numbered 47 in the collection.

The next excavation to be described is marked C on plan, and runs E. 15 S. mag. from the north end of excavation B. It was 18 feet long by 6 wide, and was sunk down to the beams under the wicker flooring (Bed 2, in Section No. 4). At the north-west corner of it was a mass of yellow clay, crowned by a limestone flag and ashes, which had evidently been a fireplace, as the flag was all burnt, and quite brittle. At the east end, near the bottom, the celt No. 41 was found. In the vicinity of the hearth were the following:—

- No. 35. A hazel nut.
- No. 36. Part of a deer's horn.
- No. 37. A piece of a fowl's bone.
- No. 38. A piece of bone.
- No. 39. A bone piercer.
- No. 40. A piece of Silurian grit.
- No. 42. Ditto.
- No. 43. A large Silurian nodule.
- No. 44. A hone, Silurian.
- No. 45. Ditto.
- No. 46. Ditto.

Under the wicker floor were a system of horizontal oak beams, parallel to the beams found in excavation B. They were 4·25 feet apart, 14 inches wide, by 3 deep. A set of oak piles ran nearly east and west, in places being a double row. They were 18 inches apart, and 3 inches in diameter, and were evidently the framework of a wall, as between them were regularly built-up sods.

Among the stones at the surface of this working were parts of the upper and lower stones of a quern. I have put the upper one among the collection (No. 72), as, though imperfect, it is unlike those that will be found in nearly every cabin in the parish of Tynagh, 7 miles west of

Loughrea. In it there are holes as if for two handles, to turn it backwards and forwards, and not describe an entire circle; while the modern querns have only one handle, and are turned round and round.

The next excavation was made a little south of the last described, and is marked F on plan. It was 15 feet long, and ran E. 10 N. (mag.), and gave the following section:—

SECTION No. 6.		Feet.	Inches.
6. Peat, clay, stones, with a few bones,	2	0	
5. Marl,	0	10	
4. Peat, with bones,	1	0	
3. Basket flooring,	0	1	
2. Peat,	3	6	
1. Stones, not sunk into,			
	7	5	

When the stones No. 1 were reached, the water spouted up, and flooded the excavation.

The basket floor, pieces of the hazel rods being in the collection No. 70, was about the same distance below the waters of the lake as that before mentioned; and under it was a horizontal beam that ran E. S. E. (mag.). On the floor were numerous bones. This was different from what was found in all the other excavations, as in them there was a layer of sods between the basketwork and the bones.

In bed No. 5 a few bones were scattered about.

In bed No. 6 there were also a few bones, and the following articles near the bottom of it:—

No. 54. A hone.

No. 55. Ditto.

No. 56. A rubstone.

No. 57. Large sling stone—Quartzite, from the old red conglomerate.

No. 58. Egg-shaped sling stone—Old red sandstone.

No. 59. An angular piece of Silurian grit, evidently artificial.

Three feet from the west end of this working was a single wicker partition, 2·5 feet high. At the south side it seemed to curve round to meet the double wicker partition in excavation E. At the north side it ended against a large beam of oak, scooped out in the middle, and apparently part of a trough (No. 68 in collection). This was standing upright on the square end, making a right angle with the wicker partition. It here seemed to have been used as a door for a hut; from its east edge ran the before-mentioned horizontal beam. The wicker partition began at the top of bed No. 5, and went down into bed No. 2.

The last excavation to be described lies near the S. E. of the island, and is marked A on plan. It was carried down for 5 feet, the bottom foot consisting of turf sods, in which there were no remains. The other 4 feet were peat mixed with bones. Between 3 and 4 feet down the articles now enumerated were found:—

- No. 10. A fine hone—Seems to be one of the Silurian grits found in the hills north of Roxborough.
 No. 11. A small slab of sandstone, used for sharpening.
 No. 12. A small sea stone. Coal measure?
 No. 13. A hone—Old red sandstone.
 No. 14. A cut piece of deer's horn.
 No. 15. A large pig's tusk.

There was also found here what seemed to be the top of a table. This latter was composed of four planks of oak, 3·5 feet long by 9 inches wide and 2 thick, with underneath two slabs 5 inches wide by 1½ inch thick. These slabs were fastened to the upper boards by dowels (No. 71), and each board was dowelled to its fellow (see dowel, No. 62). This table was so rotten, that it fell to pieces when taken out of its bed. The water came into this hole at a depth of 5 feet, and put a stop to the work.

The inferences I draw from my observations are, that a tribe, and not a family, inhabited this crannoge—each family occupying a hut, or apartment—they all having a common fire in the centre; that the island in the first instance extended much further to the south; that the inhabitants were driven out either by fire or the waters of the lake rising; but in either case it seems to have been deserted, and submerged for a period. Afterwards, by some cause or another, it again appeared above the water.* Then the natives of the country determined to repeople it; but they found that during S. E. and S. gales the whole force of the waves of the lake broke on it, and were gradually eating it away; they therefore, to preserve it, sank the before-mentioned piles and stones at its south and south-eastern shore. Mr. Foot, who assisted at the principal excavations, suggests, "That these inhabitants lived in stone huts; and that the uppermost bed in some of the foregoing sections, consisting of clay, stone, and peat, is the debris of the ruins of these." This does not appear at all unlikely; and it would account for the bones found in it, and not continuous up through the sections from their first appearance.

To arrive at full particulars, and thoroughly understand the history of the place, the whole of the ancient habitations ought to be cleared out, which could not be done properly unless the lake was lowered seven feet.

Mr. Silk, of Loughrea, bought most of the bones from the country people that burrowed this island, and he gave me the following information:—"The country people raised bones in this island and in the boggy bottom on the mainland opposite Reed's Island. The best bones were got in the latter place. In the crannoge the best and whitest bones

* Dr. Gerrard Boate, in his "Natural History of Ireland," mentions that the early English settlers carried on large drainage works in Ireland; and as their stronghold in Connaught was Athenry, nine miles distant, it is not unlikely that it was some of them that opened up the outlet from the lake.

were got deep down, near the margin." He bought altogether over 300 tons. "The excavations were carried on by women; and, as they teemed out none of them, they worked *en chemise*. Among the bones were perfect heads of oxen, sheep, goats, deer, pigs, and what seemed to be large dogs or wolves. There was also exhumed the head of a *Megaceros Hibernicus*, which measured over 13 feet from the tip to tip of its horns." This he had for some time in his possession, but unfortunately it was accidentally smashed to pieces. Mr. Jukes suggests that finding this here may not prove that the *Megaceros* was killed by the people of that age, as they may have found it, and put it up for an ornament or trophy, as is done at the present day. Besides the bones, Mr. Silk got the following articles, but unfortunately he is unable to say whether they were got high up or low down in the workings:—

Iron Shears.—These were made on the same principle as the sheep shears of the present day; but some of them were "so small and fine that they might have been used by any lady as scissors." Some of the best of these he gave to Lord Clancarty.

A brass pin, about 5 inches long, with a swivel head. "This looked like one of the *readiers* that soldiers used when they had matchlocks."

A crozier, made of brass, inlaid with rectangular pieces of silver. This he sold for £5, and thinks that it is in the Museum of the Royal Irish Academy; as the gentleman who bought it from him told him "that he had put it in the Museum."

A battleaxe.—This was about 15 inches long. It had a hatchet on one side, and seemed to have had a spike on the other. The socket for the handle was very rudely forged. He gave this along with the crozier for the £5.

A cast for a coin.—This was an iron box, about $7 \times 5 \times 3$ inches, which opened in the centre. It was filled with a white substance, like plaster of Paris, in which the die was made. On the outside were two clips to keep the box close fastened, and a round hole for pouring in the metal. Unfortunately he did not know the value of it, and left it knocking about. Afterwards the idea came into his head of taking an impression from the cast; but when he opened the box, the white substance had fallen to pieces. The box he set no value on, and does not know what has become of it.

A hammered iron vessel.—This was about the size of a large cup, but went down more square to the bottom. It looked as if it had been used for smelting purposes; and he afterward gave it to a farmer for melting lead in.*

* Since the above was read, Mr. Ryan, of Cuscarrick, Loughrea, has presented a semicircular knife, about 7 inches long by $\frac{3}{4}$ th of an inch wide, which he says was found in this crannoge. It has been put along with the rest of the collection in the Royal Irish Academy.

Crannoge No. III., or Ash Island, of which Fig. No. 8 is a plan and section, is about 60 yards from the present shore, at the south-west

Fig. 8.—Scale, 20 feet to 1 inch.

corner of the lake. When examined in August last, the surface above the water was about 20 yards in diameter, with a spur out of it toward the south-west, 3 yards long. All the present surface of the island was covered with flat stones, as well as the west side below the level of the water, for about $1\frac{1}{2}$ yard on an average. To the north and south-west spurs ran out, both being about 4 yards long, measured from the edge of the water. On the north-east, from the water's edge for 2 yards the flat stones also were observed; while on the south-east they were less than half a yard wide. The spur on the south-west, both above and below the water line, was covered with small shingle. Below the water, on the north-east, a number of parallel logs of round ash timber, about 6 inches in diameter, and 2 feet apart, are visible; and one or two logs on the east side. Only a few oak piles were remarked, three being observed on the north-east, and two to the north-west. There are no indications

that this island was surrounded by a regular set of piles; for, unless they are much shorter than those observed, the tops of the piles would appear above the surface.

An excavation was made across the east side of this island, in which was the following section:—

SECTION No. 7.

	Feet.	Inches.
8. Stones, peat, and clay,	1	0
7. Peat and bones,	3	0
6. Stones and peat,	1	0
5. Round ash logs, 6 inches in diameter, 2 feet apart, ranging N. and S.,	0	6
4. Peat,	0	6
3. Round ash logs, 6 inches in diameter, 1 foot apart, ranging E. and W.,	0	6
2. Peat, not sunk into,	3	0
1. Marl, over	6	0
	15	6

On the surface of the island, immediately above and below the line of winter inundation, numerous bones and teeth lie scattered about. These may have been washed out of bed No. 7. In bed No. 8 no bones were met with. In bed No. 7 are numerous bones, more especially towards the outside of the crannoge; wood ashes; a round sea stone (No. 7); broken and whole hazel nuts; and two hones, one of which is in the collection (No. 9). Bed No. 2 could not be sunk into on account of the water; but it seemed to be 3 feet deep, and to lie on marl that was over 6 feet deep. An east and west wicker wall was found in this excavation, which went down to the east and west logs. The stakes in it were of round fir timber, 2 inches in diameter, and about a foot apart. According to the Ordnance Survey, this island is 0·5 feet higher than the surface of the water; but their B. M., which is at the north-east corner of the island, is a foot lower than where the section was measured, which will leave the lower beams 5 feet lower than the present surface of the lake.

Crannoge No. IV., or Island M'Cool, is 180 yards from the nearest shore. All we know about it is, that it seems to be surrounded by a circle of piles, 33 feet in diameter; and that in the summer months *gun-barrels* and bronze *spearheads*, or, as they are called hereabouts, *Danes' hatchets*, are said to have been brought up in the prongs of celspears.

Mr. Hemsworth informs me that there are four canoes sunk at the east side of this island, with their prows in towards the shore. He tried to raise one of them; but it was so rotten, that it broke across in the middle. It was a log of oak, hollowed out to form the canoe. He accounts for the gunbarrels found in the following way:—About the year 1798, all the guns, &c., seized about the country were brought into Loughrea; and his grandfather, who was the magistrate in charge, being ordered to destroy them, had them all brought out and sunk in the lake.

From the above facts we may draw the following conclusions:—First, that iron was in use in the early ages of the crannoges. This is

proved by the old knife, No. 60. The sharp points on the stakes would lead to the same conclusion; also the number of hones which must have been used for the sharpening of metal implements. The cuts on the pieces of deer's horn, Nos. 16 and 36, must have been made by a very fine saw, as there are no marks of graining on the surfaces. Secondly—That when the crannoges were first built, the surface of the lake must have been at least seven feet lower than at present, as is proved by Sections 3 and 5, and by the old turf banks at the south-east of the lake, over which there are five or six feet of water. And that at a subsequent period the west part of the lake must have been twelve feet deeper than at present; this is proved by Sections Nos. 5 and 6, as in them we find six feet of shell marl under the artificial works. The change in the level of the lake must have been caused by the silting up of its outlet. The ancient stream from the lake seems to have been at the west end of the town, as in that place there is an alluvial deposit, while at its present outlet there is strong *corn* gravel; and a little below its present bed there seems to be rock. If the embouchure of the lake was at the west end, it must have run by the old Abbey to the alluvial flat on the north.

If we examine a lake that is silting up its outlet, we shall find what a tedious process it is. First, the weeds grow during the summer, and catch the heavy particles that are coming out with the water; but in the winter floods all the weeds are broken down, and most of the accumulated matter is carried away: so that in a century it would scarcely raise the bottom of the stream more than six inches; which would make the crannoges to have been built about 1400 years before the lake reached its present level. But we must consider that since Loughrea was built the lake could scarcely have changed its level; for the eastern outlet ran at the foot of the town wall, and the inhabitants would have kept it open, being part of the defences of their town. Loughrea is more than 400 years old;* but if we allow 400 years, it would make the age of the crannoges over 1800 years, or before the Christian era.

Loughrea is about a mile wide from the N. E. to the S. W., and a mile and three quarters long from the N. W. to the S. E. It contains about 900 acres, and of these at least 400 have not more than 15 feet in depth of water on them. These 400 acres could be easily drained, as it would be only necessary to open a cut from White's Bridge, that lies a mile on the north, which, according to the Ordnance Survey, is 17 feet lower than the lake.

The Rev. William Reeves read a paper "On the Bell of Armagh."

* The castle of Loughrea, or *Boille Riogh*, was built in A.D. 1236, by Richard De Burgo (Hardiman's "History of Galway," from his authority, the "Annals of Inisfallen"), and the town with its walls in the succeeding century. Of these, there now (1863) only remain the foundations of the castle, the east foss, and the keep at the S. E. gate, the N. E. gate having been demolished, by public presentment, about fifteen years ago, as it was considered an obstruction in the principal street of the town. The town seems to have been built on the margin of the lake, and the present principal outlet from the lake appears to have been made when the town was first built as a foss or dyke at the base of its eastern wall.